DOCUMENT RESUME

ED 094 640 HE 005 759

AUTHOR	Feldstein, Paul J.; And Others
TITLE	Regulating Dental Assistants: Revisions of the Michigan Dental Practice Act. Health Manpower Policy Discussion Paper Series No.: C2.
INSTITUTION	Michigan Univ., Ann Arbor. School of Public Health.
SPONS AGENCY	Robert Wood Johnson Foundation, New Brunswick, N.J.
REPORT NO	Ser-C2
PUB DATE	Nov 73
NOTE	24p.
EDRS PRICE	MF-$0.75 HC-$1.50 PLUS POSTAGE
DESCRIPTORS	Certification; *Dental Assistants; *Dentistry; *Higher Education; Manpower Development; *Manpower Utilization; *Paramedical Occupations; Research Projects
IDENTIFIERS	Michigan; *Michigan Dental Practice Act

ABSTRACT

This document investigates the regulation of dental assistants in Michigan. Emphasis is placed on increased dental productivity from increased use of auxiliaries, utilization of dental auxiliaries, and educational and training requirements for certification and licensure. Results of the investigation indicate: (1) support should be given for the use of expanded function auxiliaries (EFAs) in dental practice in Michigan; (2) serious consideration be given to the exclusion of provisions reserving dental functions to specific categories of dental auxiliary; and (3) education and training requirements should be made as open and flexible as possible to assure that an adequate supply of low cost, but highly competent labor, will be available for practice. (Author/MJM)

ED 094640

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Health Manpower Policy Discussion Paper Series

REGULATING DENTAL ASSISTANTS: REVISIONS OF THE MICHIGAN DENTAL PRACTICE ACT

by Paul J. Feldstein
Owen MacBride, and
Stephen Crane

Number: C2 November 1973

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Work on these papers is supported in total or in part by the Robert Wood Johnson Foundation

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Notes.

In 1967 the ADA House of Delegates requested that State Boards undertake revision of their respective dental practice laws to permit more effective utilization of dental auxiliaries and to eliminate the restrictive listing of educational and practical requirements for licensure.[1] After considerable analysis and discussion, the Michigan Dental Association has recommended changes in Michigan's Dental Practice Act as presented in HB 4114, now before the Senate State Affairs Committee. The intent and direction of the proposed amendments are consistent with the 1967 ADA recommendations and with our current knowledge of dental organization and practice. The changes suggested in HB 4114 should help to achieve a principle objective of both the MDA and the Michigan Legislature which is to increase the amount of high quality dental care available to the citizens of Michigan. Critical to the attainment of this objective, however, will be the type and extent of the restrictions imposed by the Board on the utilization of dental auxiliaries by dentists, as well as the educational and training requirements established for certification and licensure.

While HB 4114 seeks to amend the Dental Practice Act in a number of different respects, this analysis will address itself to the following three issues:

I. <u>Increased Dental Productivity from Increased Utilization of Dental Auxiliaries</u>.

I. INCREASED DENTAL PRODUCTIVITY FROM INCREASED USE OF AUXILIARIES.

A. The Production of Dental Services

For purposes of analyzing the dental sector it is useful to view the dentist as a "firm" producing dental services. Broadly defined, the factor inputs include the dentist's own time, the time of any auxiliary personnel, equipment such as number of chairs and type of drill, and office expenses and dental supplies. In the production of dental services, the dentist must work within a framework of technology which constrains his possible choice of combinations of factor inputs. "Technology" can be taken to mean the methods known to the dentist, the type of equipment available, and the duties which his assistants are allowed to perform. In the short run (the time in which the number of dentists is fixed), increased output of dental services can come from reorganization of the methods of dental practice or from increased productivity of the individual dental practices. To date, there is little if any information on the effect of different methods of dental practice on dental output.

One of the principle reasons for past increases in dentist productivity, and a likely source of future increases, lies in increased use of dental auxiliaries. Dentists now work fewer hours per week in their practice, in effect limiting the supply of available dental service. Production of dental services, therefore, can be increased most rapidly by hiring auxiliaries to do "standard" auxiliary functions and/or by delegating some tasks traditionally performed by the dentist to the auxiliary.[2] The alternative of producing more dentists would

be much more expensive and time consuming than introducing these additional personnel.

B. Past Trends in Dental Productivity

Several measures of output have been used to describe the increase in dental productivity: dental visits, consumer expenditures on dental care, and gross income of dentists.

When visits are used as the measure of output, the increase in productivity (visits per dentist) from 1950 to 1970 has been 1.6 percent per year. (When a shorter period is used, 1955 to 1970, the annual percent increase is lower, 1.2 percent.) Over the same time period, the number of auxiliaries has increased from 1.04 to 1.40 per dentist, or an increase of 1.5 percent per year (1.1 percent per year from 1955). The annual increase in dental productivity and in use of auxiliaries appears to be closely related. A more accurate indication of the contribution of auxiliaries to increased number of dental visits is shown in Table 1. This table shows, for each of three years for which the data are available, the number of visits per dentist with different numbers of dental auxiliaries. According to this table, with increased use of auxiliaries a dentist can increase his output from 20 to 40 percent.

When consumer expenditures on dental care (adjusted by the dental care price index) is used as the measure of dental output, then from 1950 to 1970 the annual increase in dental productivity, has been 3.1 percent. The larger annual percent increase in dental productivity, when deflated consumer expenditures on dental care are used as the measure of dental

TABLE 1

Average Annual Patient Visits per Dentist by Number of Auxiliary Personnel Employed

	Auxiliaries Employed (Full-Time Personnel Only)[f]				
Year[a]	0	1	2	3	4 or More
1958[c]	2272	3014	3174	3929	b
1961[d]	2003	2968	3706	4790	b
1964[e]	2355	3015	3946	4409	6170

[a]Data incomplete, unavailable, or unreliable for 1950, 1953, and 1968, Surveys of Dental Practice.

[b]Too few Survey replies for reliable statistics.

[c]Source: American Dental Association, The 1959 Survey of Dental Practice, p. 45.

[d]Source: American Dental Association, The 1962 Survey of Dental Practice, p. 45.

[e]Source: American Dental Association, The 1965 Survey of Dental Practice, p. 35.

[f]Auxiliaries include dental technicians, dental hygienists, dental assistants, and secretaries/receptionists.

output, is possibly a result of the fact that the nature of the average dental visit has changed over time and that this change is incorporated in the expenditure data but not the visit data.

The third measure of dental output that was used was the gross incomes of dentists. If dentists employed different numbers of auxiliaries and the price of dental care was similar among the dentists, then differences in their gross incomes would represent differences in output. For each of the years analyzed, gross incomes per dentists

increased with increased numbers of auxiliaries. In more recent years, however, the increases in gross income for each dentist-auxiliary combination have been lower.

When gross income per dentist was used to measure the increased productivity over time, it was found that gross income per dentist per hour (adjusted for dental price increases) increased 3.1 percent annually from 1955 to 1970.

Regardless of whether the output measure is visits, expenditures on dental care, or gross incomes of dentists, it is apparent that dentists overall could achieve substantial increases in productivity (1.6 to 3.1 percent per year) by employing additional auxiliary personnel.[3] More dramatically as noted above, individual dentists could increase their own output by 20% to 40% by using additional personnel (depending on existing staff, facilities, etc.).

II. UTILIZATION OF DENTAL AUXILIARIES.

There is mounting evidence that the use of "expanded function auxiliaries" (EFAs) can lead to appreciable increases in dental productivity. In several foreign countries, notably New Zealand, EFAs are being effectively utilized on a large scale. The general conclusions to be drawn from this evidence and foreign experiences are: (1) auxiliaries can be trained, in a relatively short time, to perform many functions traditionally performed by the dentist at the same level of quality provided by the dentist; and (2) the output of dental services provided by the dentist can be increased through the employment of EFAs.

The evidence deduced below demonstrates that legally delegatable functions can be assigned to any of a variety of dental care personnel, each with widely differing educational and practical backgrounds, with the same results in terms of increased availability and maintenance of high quality dental care. This evidence, rather than suggesting the need for recategorization of dental auxiliary personnel as set out in HB 4114, argues more for the liberalization of the restrictions on the functions to be delegated to the hygienist and the assistant by the dentist. The elimination of such restrictions on the use of dental auxiliaries as specified, for instance, in Section 9A (1) and (2), would result in an increased substitutability of functions among personnel. Thus, potentially fewer personnel would be necessary to produce the same output and quality of dental care. The greater use of less costly, but equally competent personnel, would result in lower cost to the dentist and to the patient.

A. Domestic Civilian Studies

In a study conducted in Louisville, Kentucky, by the Division of Dental Health, dental assistants received 48 weeks of training to perform additional tasks. Using a "procedures completed per day" measure of output, a team of one dentist and four EFAs was 133 percent more productive than a "traditional" team of one dentist, one chairside assistant, and other "office" help. Using a "time limit" measure of work, the EFA team increased productivity by 123 percent over the "traditional" team. A team of one dentist and three EFAs treated 62 percent more patients, performed 84 percent more procedures, and

accomplished 80 percent more time units than did the "traditional" team. The work performed by the EFAs was highly satisfactory from a professional viewpoint, and the patients treated indicated a high degree of satisfaction with the work provided.[5]

A continuing study conducted at the University of Alabama involved the delegation of expanded functions to "dental therapists," high school graduates who were given two years training in the performance of various intraoral tasks.[6] The therapists were found to perform as well as dentists in inserting and finishing amalgam and silicate restorations, inserting temporary fillings, and placing matrix bands for amalgam restorations. In fact, the quality of work done by the therapists was often found to be <u>better</u> than that rendered by advanced dental students.[7-9]

In a study conducted by the Department of Indian Health, dental health teams consisting of one dentist and two assistants were organized. The assistants were Indian women who received eight weeks training, including one week on "clinic management." The assistants selected, contoured, placed, and removed matrix bands, placed alloys, and carved Class II restorations; and the quality of their work was found to be comparable in quality to that of dentists.[10]

A program conducted by the Philadelphia Department of Public Health utilized "technotherapists," former dental assistants who received six months additional training. The technotherapists then performed many technical services traditionally handled by dentists, including virtually everything in the area of operative dentistry except

the injection of local anesthetic, the cutting of cavity preparations, and certain other functions. The work of the technotherapists was found to be highly satisfactory in comparison to that done by dentists, and even the quality of work performed by the dentists themselves was found to be upgraded, due perhaps to the "competition" provided by the technotherapists. Teams of one dentist, three technotherapists, two assistants, and one clerk were found to be capable of doing as much work as four dentists each working with one chairside assistant. This productivity increase is an overstatement in that the functions performed extended only to examinations, cleanings, and fillings; but it is an understatement in that the teams were forced to use a facility not well-suited to efficient operation of the team.[11]

B. Military Studies

In an experiment conducted at Great Lakes Naval Training Center, dental "technicians" received 23 weeks training on dental anatomy, dental materials, oral hygiene, applying rubberdams, inserting cavity liners or bases, placing matrix bands, and inserting and finishing amalgam and silicate fillings. The quality of work done by the technicians in performing these functions was deemed to be "as satisfactory as conventional methods." The combination of one dentist and four technicians, working at three chairs, was found to be highly efficient. Some dentists increased productivity by over 80 percent, and treated twice as many patients using this set-up as compared to the conventional "one chair" operation.[12, 13]

A program conducted in the Canadian military took experienced

"clinical technicians" (the counterparts of civilian dental hygienists) and gave them four weeks training on an individualized basis in expanded functions. The training was in functions similar to those performed by the "technicians" in the Great Lakes Study, plus training in certain simple standard procedures in prosthodontics and periodontics. When the technician was added to a "team" of one dentist, one chairside assistant, and one roving assistant, team productivity increased 99.1 percent, of which 61.7 percent was attributed directly to the technician's participation and 37.4 percent to increased productivity by the other members of the team. Other teams, composed of one dentist and one technician, accomplished on the average in a 6.5 hour day the same amount of work done by a dentist working alone in 10.5 hours--a 61.5 percent increase. (Three treatment rooms were found necessary to effectively utilize these two-man teams.) Further, the dentists involved were able to make more productive use of their time due to the technicians' participation. The percentage of his time which the average dentist spent actually operating increased from 49.8 percent to 75.0 percent; and the dentist spent less time idle or doing "non-productive" work such as greeting patients, etc.[14]

C. Experiences in Other Countries

In several foreign countries, dental care providers, faced with a shortage of dental manpower, have turned to expanded function auxiliaries with successful results. The leading example is the New Zealand dental nurse program. The nurses are trained to provide initial examinations and charting, prophylaxis, topical application of fluorides, operative

dentistry for deciduous and permanent teeth, extraction of teeth, and dental health education. When trained, each nurse becomes responsible for the dental health care of approximately 500 school children. Groups of 80 nurses are monitored and supervised by one dentist. Surveys indicate that the program has resulted in better oral health for patients, and that the work done by the nurses has been of high quality. Use of this system has made possible the provision of a much greater supply of dental care to the people of New Zealand than would otherwise be available, given their supply of dentists.[15]

A survey conducted by Leatherman found that "there has been a marked increase in the training and use of the New Zealand-type nurses in the developing countries and Australia." In 1960, six countries were using New Zealand-type nurses in public dental services, while by 1968 fourteen countries were utilizing this auxiliary. The nurses are typically trained for two years and perform intraoral functions including regular examination, prophylaxis, filling of teeth, extraction of teeth under local anesthesia, and radiographic examination. Leatherman forecasts that, in the future, these nurses will be allowed to work with less and less direct supervision by a dentist. Leatherman also predicted more and more delegation of comprehensive duties to dental hygienists.[16]

Arnold has concluded that the delegation of certain functions to a properly trained clinical chairside assistant would save fifty percent of the dentists' time normally needed for a filling. These functions include taking impressions for study casts, placing and removing rubberdams and matrix bands, condensing and carving amalgam

restorations in previously prepared teeth, placing of silicate and acrylic restorations in previously prepared teeth, applying the final finish and polish to the above listed restorations, and placing and removing temporary restorations.[17] The World Health Organization has advised nations with dental health programs to expand their dental services by the utilization of auxiliary personnel (including chairside assistants, laboratory technicians, and EFAs) and the development of dental health teams.[18]

It is thus apparent that the dental "firm" can increase its output of services by greater use of auxiliary personnel, especially through the delegation to auxiliaries of tasks traditionally performed by the dentist. It is also clear that a wide variety of personnel may be used to serve these ends with little effect on the quality of care. Most of the demonstrations in this country and the foreign experiences with EFAs support the finding of more services per dentist through greater use of dental auxiliaries. The dentist is thus freed for other more complicated tasks, and the total amount of services produced per dentist is increased with no reduction in quality.

III. EDUCATIONAL AND TRAINING REQUIREMENTS FOR CERTIFICATION AND LICENSURE.

The Michigan Dental Association has, in our opinion, acted wisely in suggesting and supporting the elimination of the very precise education and curricula requirements for program accreditation as specified originally in Sec. 3 (2) 1-4 of the Dental Practice Act. While the actual determination of the education and training requirements for dental

assistants will be set by the Board as prescribed in HB 4114, we would suggest that competency be assessed on the basis of proficiency examinations rather than solely on professional or educational background. As will be shown, proficiency examinations offer the same if not greater assurances of quality as the system based on rigid educational, experiential criteria, but at much reduced cost.

According to the "Report of the Inter-Agency Committee on Dental Auxiliaries" (JADA, May 1972, p. 1029), requirements for approval of a Certifying Board for Dental Assistants was accepted by the ADA in 1960. Dental assistants who completed a special 104 hour educational program before 1967 were eligible for examination until 1969. Since 1969,M.A. candidates for examination by the Certifying Board must have completed an accredited educational program which should be at least one academic year in length and be conducted in an accredited post-high school educational institution. Notwithstanding these requirements, it has been estimated that the number of dental assistants trained on the job is approximately 12,000 per year.[19]

With regard to the demand for educational training by dental auxiliaries,there is some evidence to suggest that the demand for such training has greatly increased in recent years. The salaries of dental auxiliaries nationally have been increasing relative to salaries paid in occupations with roughly comparable requirements. The relative wage of dental assistants to that of secretaries, stenographers and typists was .81 in 1955 (median salary of a dental assistant was $2,333 while for a secretary, stenographer and typist it was $2,877). In 1971,

although salaries of both groups increased, salaries for dental assistants increased more rapidly so that their relative wage is now 106% of a secretary's, stenographer's or typist's salary (the salaries were $4,764 and $4,494).[20] When other occupational groups are used, for example workers employed in the retail trade, the same relationship is evident. The relative wage was .72 in 1950 and 1.11 in 1971. This large increase in the wage of dental assistants relative to other occupations suggests that there has been an increase in the demand for dental assistants. Although the majority of dental assistants receive on-the-job training, increased standards for certification for dental assisting would (depending on its effect on the rate of return) increase the demand for the formal educational requirements in order to meet those standards. Such requirements would have the effect of raising the cost to the dentists of utilizing these personnel, given that the price of the assistant (wage) would include elevated educational costs caused by certification and licensing regulations. The increase in cost may eventually lead to a decrease in the use of these auxiliaries by dentists, which potentially could diminish the total impact of this legislation on increasing the amount of dental care available to Michigan residents. Ultimately, the cost of educating and training dental assistants would result either in increased costs of dental care for consumers, or lesser availability of care, or both.

The above concern with cost should not be construed as a disregard for the quality of dental care provided. What we are proposing, very

simply, is that determination of qualifications for licensure can be made most appropriately by proficiency examinations which assess skill and competence rather than by specification of educational requirements or years of practice as prerequisites for licensure. We have already demonstrated how educational requirements can contribute to the cost and availability of dental care. Specification of required years of practice or number of operations performed essentially limits the flow of dental assistants into full-time practice by necessitating some form of training period. The time necessary to complete this training further restricts the supply of dental care services which in turn increases the cost of care to the consumer.

IV. CONCLUSION.

To summarize our arguments, we are in support of legislation which will allow greater utilization of EFAs in dental practice in Michigan. Current research suggests that significant improvements in the productivity of Michigan dentists can be anticipated from more efficient utilization of EFAs. Research also indicates that the quality of dental care will not suffer, but quite to the contrary may actually be improved by the greater utilization of auxiliary dental personnel.

We recommend that serious consideration be given to the exclusion of provisions reserving dental functions to specific categories of dental auxiliary. As we have demonstrated, fractionation of delegatable services among dental personnel may result in a higher cost for dental care due to the larger number of EFAs necessary to perform different

tasks. We are in favor of as much delegation as possible to the lowest level of personnel regarded as competent by the Board.

We further recommend that education and training requirements be made as open and as flexibile as possible to assure that an adequate supply of low cost, but highly competent labor, will be available for practice. Proficiency examinations to determine competency, particularly if administered periodically to all licensed professionals (including perhaps renewable licenses based on examination) provide a far more secure assurance of the current quality of care than simply the satisfaction of certain "process requirements" at the time of initial licensure or certification. As research has shown, process requirements have often been established by a profession more to assure a certain level of income to itself than to assure a particular level of service quality for the consumer. The research presented in this analysis (Section II) indicates that on-the-job training, in many instances, develops skills at least comparable to those of highly educated dental auxiliaries but at much reduced cost. Competency based on proficiency examinations, therefore, will help to provide an adequate supply of highly qualified personnel at least cost.

In general, the more restrictions that are placed either on the training or utilization of dental auxiliaries, the greater will be the potential cost of producing these personnel and the lower their potential utilization. The ultimate significance and impact of these restrictions can only be measured in terms of reduced availability of dental care and hence, diminished dental health status for Michigan residents.

NOTES

[1]American Dental Association, House of Delegates, "The Training and Utilization of Dental Hygienists and Dental Assistants," American Dental Association Transactions, 1967, 108:277-282.

[2]Maurizi attempted to measure the annual percent increase in dentist productivity attributable to technical change over time. He compared the change in dentist time-input required to perform various types of services between 1943 and 1950 and between 1943 and 1958. The result of his calculations were that technical change increased output by approximately one percent per year between 1943 and 1950. Using some of the earlier data, Maurizi adjusted the dentist time-input by age of dentists and derived a second estimate of increased output due to technical change of .84 percent per year.

(Maurizi also estimated a production function based upon cross-section data from the 1961 Survey of Dental Practice. The estimated function is:

$$\log VPD = .62798 + .466 \log AUX + .77 \log HRD + .254 \log CHR$$

where VPD = annual patient visits per dentist; AUX = number of auxiliary personnel employed by the dentist; HRD = annual hours worked by the dentist; and CHR = number of chairs in the office.)
Alex Maurizi, Economic Essays on the Dental Profession, Iowa City, Iowa: College of Business Administration, The University of Iowa, 1969.

Another study estimated the time saved, hence additional caries filled and bridges placed, of using high speed cutting equipment.

"The total theoretical saving of dentists' time from the use of high speed equipment is, therefore, the equivalent of 1,741 dentists (over the period 1950 to 1975)." Assuming (among other things)that the number of dentists in 1975 were to be 115,000, then this savings in time would represent a 1.5 average annual increase in dentist productivity. American Council on Education, The Survey of Dentistry, Washington, D.C.: American Council on Education, 1961, p. 478.

These findings must be considered highly tentative due to data limitations, but they suggest an annual productivity increase due to technological change of about one percent.

[3]Studies of dental practices in Canada have yielded similar results. Hall found that Canadian dentists who use assistants see more patients per day. Those dentists surveyed who employed no assistants averaged 10 to 12 patients per day; dentists with one full-time assistant averaged 15 to 17 patients per day; and dentists using two to four full-time assistants saw 16 to 20 patients per day. Although Hall did not collect gross income data, he did find that those dentists with higher net incomes tended to make greater use of auxiliaries than did those dentists who earned less. Oswald Hall, Utilization of Dentists in Canada, Royal Commission on Health Services, Queen's Printer, Ottawa, 1965.

[4]For a summary of the literature in this area see D. B. Ast, "Changes in Oral Health Delivery Systems Resulting from Implementation of More Efficient Preventative Measures and Greater Delegation of

Respons bilities to Auxiliaries," Position Papers on an Improved Oral Care System, 1972 (to be published).

[5]S. Lotzkar, D. W. Johnson, and M. B. Thompson, "Experimental Program in Expanded Functions for Dental Assistants: Phase 3 Experiment with Dental Teams," Journal of the American Dental Association, Vol. 82, p. 1067 (1967).

[6]JADA, Objections, June 1973.

[7]P. E. Hammons and H. C. Jamison, "Expanded Functions for Dental Auxiliaries," Journal of the American Dental Association, Vol. 75, p. 658 (1967).

[8]P. E. Hammons and H. C. Jamison, "Increasing the Production of Dental Auxiliaries," Journal of the American College of Dentists, Vol. 35, p. 154 (1968).

[9]P. E. Hammons, H. C. Jamison, and L. L. Wilson, "Quality of Service Provided by Dental Therapists in an Experimental Program at the University of Alabama," Journal of the American Dental Association, Vol. 82, p. 1060 (1971).

[10]Joseph Abramowitz, "Expanded Functions for Dental Assistants: A Preliminary Study," Journal of the American Dental Association, Vol. 72, p. 386 (February 1966).

[11]D. A. Soricelli, "Practical Experience in Peer Review Controlling Quality in the Delivery of Dental Care," American Journal of Public

Health, Vol. 61, p. 2046 (October 1971).

[12]W. E. Ludwig, E. O. Schoebelen, and R. J. Knoedler, Greater Utilization of Dental Technicians, I. Report of Training, U.S. Naval Training Center, Dental Research Facility, Great Lakes, Illinois, 1963.

[13]W. E. Ludwig, E. O. Schoebelen, and R. J. Knoedler, Greater Utilization of Dental Technicians, II. Report of Clinical Tests, U.S. Naval Training Center, Dental Research Facility, Great Lakes, Illinois, 1964.

[14]K. M. Baird, D. B. Shillington, and D. H. Protheroe, "Pilot Study on the Advanced Training and Employment of Auxiliary Dental Personnel in the Royal Canadian Dental Corps: Preliminary Report," Canadian Dental Association Journal, Vol. 28, p. 627 (October 1962).

[15]Sir John P. Walsh, "The Dental Nurse," American College of Dentists Journal, Vol. 32, p. 62 (1965).

[16]G. H. Leatherman, "Survey of Auxiliary Dental Personnel," International Dental Journal, Vol. 19, p. 49 (1969).

[17]G. Th. E. R. Arnold, "The Dental Assistant, the Clinical Chairside Assistant and the Dental Hygienist as Members of the Dental Team in General Practice," International Dental Journal, Vol. 19, p. 12 (1969).

[18]World Health Organization, Report of the Expert Committee on Dental Auxiliary Personnel, Technical Report Series No. 163, Geneva, 1969.

[19]R. Castaldi, "Dental Auxiliaries: Dentistry's Dilemma," JADA, p. 1080 (May 1972).

[20]Various issues of The Survey of Dental Practice and the Statistical Abstracts of the U.S.